

10.1 CRANIAL NEURALGIA

AEROMEDICAL CONCERNS: The pain of cranial neuralgia can be incapacitating in flight. The symptoms of trigeminal neuralgia may be stimulated by the wearing of an oxygen mask. Glossopharyngeal neuralgia has been associated with syncope and cardiac arrest.

WAIVER: Because of the severity and chronic recurrent behavior of the neuralgias, these are CD, waiver usually not considered.

INFORMATION REQUIRED:

1. Neurology or neurosurgical consultation

TREATMENT: Pharmacological treatments (Tegretol, Triavil, Prolixin, Mexitil), although effective, are not waiverable due to their side effects profiles. Surgical "cures" (microvascular decompression) may be achieved, and waivers may then be considered on a case by case basis.

DISCUSSION: Although most cranial neuralgias are probably due to microvascular compression at the root entry zone, other etiologies need to be considered, especially in the young adult population in whom demyelinating disease, aneurysms, neoplasms, and infectious etiologies (post-herpetic, Lyme disease, etc) may be more common. The finding of sensory loss in the company of neuralgia should alert the flight surgeon to consider these other causes of cranial neuralgia.

ICD-9 CODES:

350.1 Trigeminal Neuralgia

352.1 Glossopharyngeal neuralgia

10.2 DECOMPRESSION SICKNESS

AEROMEDICAL CONCERNS: Residual neurological/neuropsychological impairment is a safety of flight issue. Most individuals who have suffered DCS make a full recovery and are not at increased risk for recurrent DCS. Decompression sickness with full recovery is not considered disqualifying (NCD) for flying duties. Type I or Type II DCS with residual symptoms after treatment is CD, however waiver may be considered on a case by case basis. Neurology (and possible neuropsychological examination) is required for waiver consideration.

The flight surgeon with a patient with suspected DCS should:

1. Make an aeromedical disposition after consulting with NOMI MOOD.
2. Document a normal evaluation by neurologist, DMO or HMA prior to returning a member to flight status.
3. Members with a history of DCS should be referred for hypoxic training using the Reduced Oxygen Breathing Device (ROBD) as it becomes available for use.
4. Bubble contrast echo is offered to patient only as an option.
5. Neuropsychological testing is not required for a return to flying status.

Grounding requirements:

1. Type I DCS: 3-7 days
2. Type II DCS: 14-30 days

TREATMENT: Recompression therapy is the standard, however many Type I patients will respond completely to surface oxygen therapy and may not require hyperbaric oxygen.

DISCUSSION: Often we err on the conservative side and treat patients whose findings and symptoms may be equivocal, especially in the training commands where students are instructed to report any and all symptoms that occur following low pressure chamber flights. A high index of suspicion in this setting coupled with enthusiasm for treatment must be weighed in evaluating the outcome and disposition. Diving-related cases of DCS tend to be more straightforward, as well as more severe. These patients often receive relatively delayed treatment and are more likely to suffer permanent residual effects. Except for older age, no factors are clearly linked to increased risk for recurrent DCS. Individuals who do suffer recurrent DCS are probably at higher risk for reasons that cannot be defined or predicted and should not be considered for waiver without careful evaluation of the risk-benefit factors. The above recommendations adopt the policy used by the Navy diving community and consider DCS as a treatable occupational hazard that should have no adverse impact on a member's future career following full clinical recovery. The USAF adopted this policy and requires 72-hour grounding after resolution of all symptoms. These recommendations allow better treatment of aircrew with DCS, establishes a realistic database, and would afford the aeromedical community a better understanding of the actual magnitude of the DCS risk.

ICD-9 CODES:

993.3 Decompression Sickness
993.30 Type I DCS, pain only
993.35 Type II DCS

10.3 EPILEPSY/SEIZURE

AEROMEDICAL CONCERNS: The risk of seizure in flight is obvious. The number of solo airborne seizures with a survivor equals zero.

WAIVER: A single, febrile seizure under age 5 is NCD. Two or more febrile convulsions are CD, waiver considered. A single seizure clearly attributable to a toxic cause may be considered for waiver. All other seizures are CD, no waiver. Myoclonic jerks associated with G-LOC are NCD.

INFORMATION REQUIRED:

1. Neurological consultation
2. EEG
3. MRI scan

TREATMENT: N/A for waiver purposes. Exceptions might be considered for surgical "cures" (e.g. temporal lobectomy).

DISCUSSION: The risk of having a first seizure falls from about 0.4% at age 20 to 0.06% at age 50, before rising sharply to 0.8% by age 70. The late rise is because of the increase in precipitating factors such as neuronal degeneration and cerebrovascular disease. After a single, unprovoked seizure in adults, the risk of a second episode while not taking anticonvulsants is 64% over 3 years and 80% at 5 years, with over two thirds of these occurring during the first year. With no risk factors, such as previous neurological insult or a sibling with epilepsy, the risk of a second seizure is 23% at five years. Relapse, even after many years of symptom-free existence without therapy, is possible. These figures apply to individuals living at one atmosphere and one +Gz. The risk for seizure recurrence associated with exposure to the physiological stressors of military aviation is likely to be much higher. Etiologies for seizures in the adult include alcohol (25%), brain tumor (16%), cerebral infarction (14%), trauma (4%), miscellaneous (5%) and unknown (36%). The EEG does not prove or disprove the diagnosis, although an unequivocally abnormal EEG with a good history of seizure does support the diagnosis. EEGs are normal in half of the patients with frank epilepsy. An epileptiform EEG does not, by itself, signify the presence of epilepsy.

ICD-9 CODES:

780.3 Epilepsy/Seizure

780.3 Convulsive episode, unspecified cause

780.30 Infantile Seizure

345.9 Epilepsy

10.4 GUILLAIN-BARRE SYNDROME (ACUTE INFLAMMATORY DEMYELINATING POLYNEUROPATHY - AIDP)

AEROMEDICAL CONCERNS: Skeletal muscle weakness which can involve extremity, truncal or bulbar groups and typically evolves over a matter of several hours to a few days can affect flying and aircrew abilities, creating safety of flight as well as mission completion concerns. In the C. Miller-Fisher variant, ataxia as well as ophthalmoplegia (internal and external) accompanies the obligatory findings of areflexia. Dysautonomia may also be present, posing an additional concern regarding tolerance of gravitational force changes, blood pressure, and cardiac rhythm disturbances that may be especially life-threatening in the aviation environment.

WAIVER: A waiver can be considered after full recovery of strength and autonomic nervous system function. Tendon-stretch reflexes may never return, but would not prohibit waiver recommendation.

INFORMATION REQUIRED:

1. Neurology or PM&R (physical medicine and rehabilitation) consultation that includes quantified strength testing of all motor groups and assessment of autonomic nervous system function (orthostatic BP measurements, treadmill testing, and, if appropriate, thermal stress testing)
2. Functional cockpit and egress testing should be considered, but are not necessarily required
3. Gravitational tolerance testing should be performed if autonomic instability is a concern

TREATMENT: Plasmapheresis and/or intravenous immunoglobulin (IVIG) therapy is warranted in those cases which involve weakness progressing to the point of impairing walking or respiratory abilities. Adrenocorticosteroid therapy is not beneficial and may actually worsen the outcome.

DISCUSSION: Antecedent flu-like illness within two weeks prior to the onset of neurological symptoms occurs in approximately 65% of cases. This syndrome often occurs in clusters of small epidemic proportions and may have broad spectral presentations ranging from minor (e.g. Bell's palsy) to severe (complete paralysis of all skeletal muscle groups with respiratory and cardiovascular support dependency). Some of these patients may experience relapses and progress to chronic inflammatory demyelinating polyneuropathy (CIDP). HIV positive patients may present with AIDP. Lyme disease may mimic AIDP. The presence of pleocytosis in the CSF is incompatible with AIDP and suggests alternative diagnoses (e.g. sarcoidosis, leptomeningeal lymphomatosis).

ICD-9 CODE:

357.0 Guillain-Barre Syndrome

10.5 HEADACHES AND MIGRAINE (including headache algorithm)

AEROMEDICAL CONCERNS: Severe headaches can be incapacitating in flight, while milder headaches may act as a distraction. Migraine may involve visual and other aura, nausea and vomiting, and transient neurological deficits that may include aphasia, hemisensory and hemimotor impairment, vertigo, syncope, confusion, and disorientation. These are of obvious concern in aviation personnel. Cluster headaches are incapacitating and may be associated with transient neurological symptoms, lacrimation, and a unilateral Horner's syndrome.

WAIVER: The specific nomenclature or diagnostic label of the headaches is not the key factor for determining whether it is disqualifying. Of greater concern is the effect on general performance, special senses, and risk of recurrence. The aeromedical disposition of members with headache will depend on the frequency and severity of the symptoms, the etiology, and the medication required to control the headaches. The accompanying algorithm may be used to help determine whether a history of headache is disqualifying or not.

Severity criteria: If any of the following criteria are met, the headache is considered disqualifying:

1. Prohibits performance of required social, vocational or academic activities
2. Member sought Emergency Department, hospital or acute care
3. Neurological dysfunction other than nausea/vomiting or photophobia (especially disturbance of special senses, balance, or motor function)
4. Requires other than simple analgesics or non-pharmacologic methods for control.

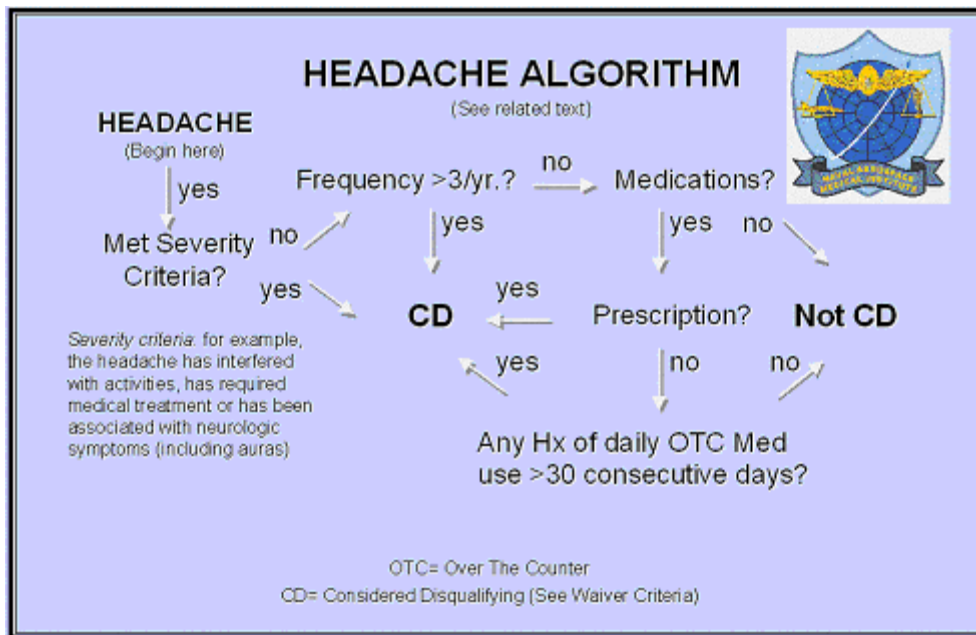
Waiver Consideration Factors: If the headache is determined to be disqualifying, the following factors are considered in the waiver recommendation. Please note these conditions require evaluation by NAMI Neurology and Code 342 prior to issuance of clearance. A Local Board of Flight Surgeons or Aeromedical Summary should not issue clearance prior to review. The following factors should be considered when submitting for a waiver:

1. Frequency
 - a. Severe headache occurred during flight
 - b. More than three severe headaches per year (if fewer than 3 headaches per 12 months, LBFS or AMS can be submitted.)
2. Predictability
3. Severity
4. History of any Incapacitation
5. Treatment Required
 - a. Non-pharmacologic
 - b. PRN abortive therapy (Prophylactic therapy requires NAMI review and/or evaluation)
6. Type of aircraft
7. Flight hours and experience
8. Specific diagnosis and presentation

9. Status
 - a. Applicant or designated
 - b. Class I vs. Class II/III

INFORMATION REQUIRED:

1. Neurology consultation



TREATMENT: Simple analgesics are acceptable. The use of NSAID's may be considered for waiver on a case-by-case basis. Life-style changes, biofeedback, and relaxation therapy, if successful, may permit return to flight status for the muscle-contraction or "tension" headache sufferer. Psychiatric/psychological evaluation of these members is strongly recommended. Lithium, methysergide, intranasal lidocaine, adrenocorticosteroids, oxygen inhalation, and sumatriptan may be effective in treating cluster headaches, however neither the cluster headaches nor these treatments generally would be considered for waiver. Although there are many effective pharmacologic treatments for migraine, most are incompatible with waiver.

DISCUSSION: Historically, migraine patients who have returned to flying duties claimed to have had no symptoms for periods ranging from 6 months to several years. This suggests that the original diagnosis was incorrect, that our understanding of the natural history of migraine is at fault, or that symptoms are being deliberately suppressed in order to return to flying. Migraines often begin in adolescence then may remit for several years, usually returning by mid-life. At least 70% of migraineurs have a family history for the same. Less than one third of patients have "classic" migraine with visual aura, but nearly one half will have paresthesias (usually lingual and perioral) with their attacks. Vertigo occurs in about 10% of the cases. Auras typically last 15 - 20 minutes and are followed by unilateral, throbbing headaches associated with photo- and phonophobia, nausea, anorexia, and torpor. Most patients prefer to lie in a dark quiet room for relief. Precipitants for migraine may include dairy products, chocolate, MSG,

nitrates (preserved meats), tyramine (aged cheese, pickled herring, yogurt, fava beans), sleep deprivation, food deprivation, barometric pressure changes, ice cream, and invariably, alcoholic beverages. Digital pressure applied to the temples, cold packs, and caffeine are usually beneficial in providing relief. Many patients have a history of carsickness in childhood.

Cluster headaches occur almost exclusively in men, begin in the third or fourth decade, are unilateral, and never change sides. Clusters consist of recurrent severe headaches lasting about 45 minutes, several times daily for a few weeks to months at a time, with a tendency to recur annually, often around the summer or winter solstice.

Recurrent muscle-contraction or tension headaches are associated with depression in the majority of cases, however, underlying cervical spondylosis and DJD may be a contributing factor and will respond to NSAID's and physical therapy. Exertional headaches, cough headaches, and immersion headaches may be associated with posterior fossa pathology (especially Arnold-Chiari Malformation), thus warranting a MRI scan. Coital headaches are almost always benign. Incorrect prescription for astigmatism may also be a cause for headaches; however eye and ENT pathologic explanations are unlikely unless the patient has obvious gross clinical findings of disease in these areas.

ICD-9 CODES:

346.0 Migraine with aura

346.1 Migraine without aura

346.2 Cluster headache

346.8 Other forms of migraine (include ophthalmoplegic)

307.81 Tension headache

10.6 MULTIPLE SCLEROSIS

AEROMEDICAL CONCERNS: MS typically presents with visual disturbance, vertigo, lower body weakness, or sensory changes. The symptoms can present over a period of time as short as a few hours. Mild dementia may occur in 20% or more of patients. In some cases, paroxysmal events lasting less than 5 minutes (trigeminal neuralgia, abdominal "crises", myoclonus) can be the presenting feature.

WAIVER: A diagnosis of definite MS is permanently disqualifying without waiver. Waivers may be considered for uncertain diagnoses that may be classified as monosymptomatic demyelinating disease, possible MS, etc. Usually a period of grounding for observation of 6 to 12 months after full recovery from the "attack" of monosymptomatic disease is required. Laboratory findings are critical in predicting the likelihood of progression to MS.

INFORMATION REQUIRED:

1. Neurology consultation
2. Multimodality evoked potentials
3. MRI scans (brain and spinal cord)
4. CSF (cells, protein electrophoresis, IgG, oligoclonal bands, myelin basic protein)
5. Monocular color vision testing
6. Visual fields
7. Retinal photographs (if indicated)
8. Neuropsychological testing (if indicated)

TREATMENT: High dose intravenous methylprednisolone (250 mg qid x 3 days) followed by eleven days of tapering prednisone (1 mg/kg) given ASAP for the first "attack" of MS may reduce or delay the subsequent progression to relapsing-remitting or chronic progressive MS. Beta Interferon may also have a prophylactic or delaying effect on the development of MS.

DISCUSSION: The average age of onset is 33 years, with a male:female ratio of 2:3. The onset is of a single CNS white matter lesion in 55% of cases, with optic neuritis (ON) occurring in 16-30% of initial presentations. ON will occur at some time during the disease in 30-70% of cases, and 25% of these will have a recurrence of ON. In 90% of persons with ON, recovery is complete. Up to 20% of cases follow a benign course with no permanent disability, 20-30% follow an exacerbating/remitting course, 40% follow a remitting/progressive course, and 10-20% show steady progression. In the early stage the attack rate is 0.5/year falling to 0.25/year in intermediate years. In 5% of cases, there is a latent period of several years between first and second attacks, while in a few cases the disease becomes totally quiescent. The features suggesting favorable prognosis are onset before 35 years, acute onset with only 1 symptom, and predominantly sensory symptoms. Poor prognosis is associated with onset at age greater than 35 years, more than 1 symptom with each attack, early onset of motor signs within 5 years, and male gender.

ICD-9 CODES:

340.0 Multiple Sclerosis

341.9 Monosymptomatic demyelinating disease or possible MS

10.7 PERIPHERAL NEUROPATHY

AEROMEDICAL CONCERNS: Depending upon the nerve or nerves involved, peripheral nerve dysfunction may represent a trivial nuisance (e.g. meralgia paresthetica) or a grounding impairment (e.g. radial nerve palsy). Full recovery of neurological function, elucidation of the underlying etiology, and certainty regarding the prognosis are issues to be considered in the individual with peripheral nerve abnormalities.

WAIVER: Most conditions require grounding pending full recovery (if it occurs) and establishment of a firm diagnostic understanding of the cause of the patient's neuropathy.

INFORMATION REQUIRED:

1. Neurology consultation
2. Supporting laboratory findings (where appropriate), such as EMG, NCV, evoked potentials, thyroid functions, Lyme serology, VDRL, HIV, B12, folic acid, ESR, protein electrophoresis, heavy metals, etc.

TREATMENT: Depends on the underlying cause, if known and if treatment exists.

DISCUSSION:

Bell's Palsy: During the acute phase of the paralysis, grounding is required both as a result of the disabling nature of acute facial nerve weakness (difficulty speaking clearly, inability to blink and close the eye in response to visual threats) and because of the fact that not all Bell's palsies are mononeuropathies (i.e. may evolve into acute inflammatory demyelinating polyneuropathy a.k.a. Guillain-Barre, or may be associated with other systemic conditions such as Lyme disease or sarcoid). Once full function has returned, member is PQ. In the event of incomplete recovery or recurrence of facial palsy, waivers are considered on a case-by-case basis.

Carpal Tunnel Syndrome: Safety of flight concerns due to impaired fine motor coordination, strength, sensation, and abnormal sensations in the fingers and hands require grounding until adequate resolution of the neuropathy has been achieved. Waiver requests should include results of electrophysiological studies and functional demonstration of satisfactory recovery (e.g. performance in simulator, cockpit egress testing, operation of safety harness and parachute fittings, etc).

Ulnar/Radial Neuropathy: Same as for Carpal Tunnel Syndrome.

Peroneal Neuropathy: Must demonstrate sufficient return of strength to control rudder and brake pedals and safely egress from aircraft (documented by actual testing) to be considered for waiver. Please also submit electrophysiological test results.

Sciatica: Return of strength (as for peroneal neuropathy) in addition to disappearance of pain (off medication) is required for waiver consideration.

Meralgia Paresthetica: As this is only a sensory neuropathy, waiver can be recommended as long as the member is not disabled or impaired by discomfort and can tolerate the symptoms without need of medication.

ICD-9 CODES:

351.0 Bell's Palsy

355.0 Sciatica

355.1 Meralgia Paresthetica

354.0 Carpal Tunnel Syndrome

356.1 Peroneal neuropathy

10.8 SUBARACHNOID HEMORRHAGE (SAH)

AEROMEDICAL CONCERNS: The major risk is rebleeding, but there is also a risk of developing hydrocephalus. Bleeding usually follows sudden increases in blood pressure, and it is likely that the anti-G straining maneuver could be just as effective in this as exercise, lifting, or defecation.

WAIVER: Waiver is not usually granted for patients who have undergone surgical repair of leaking intracerebral aneurysms or removal of AVM's. Patients who have recovered fully from idiopathic SAH with conservative measures may be considered for waiver after 2 years. Patients who have undergone surgical repair of unruptured aneurysms and exceptional cases of repaired ruptured aneurysms may be considered for waiver by way of SBFS.

INFORMATION REQUIRED:

1. Neurosurgical opinion and confirmation of successful obliteration of the vascular anomaly
2. Neurological evaluation
3. Neuropsychological evaluation
4. MRI or CT scan to confirm absence of hydrocephalus or superficial siderosis

TREATMENT: Intracranial surgery is disqualifying for flying duties.

DISCUSSION: Most patients with this condition have ruptured a Berry aneurysm. Approximately 5% have bled from an AVM and 15% have no identifiable cause. About 25% of patients treated conservatively die within 24 hours of rupture of intracranial aneurysm and up to 25% die in the following 6 months from recurrent hemorrhage, cerebral infarction, or following vasospasm. In the survivors, the risk of rebleeding is just over 2% for the first year declining to almost 1%/year after that. Only 32% of such cases are reported to lead a normal life after the bleed. Those patients in whom no cause is found tend to have a better prognosis. Aneurysms are multiple in 10-20% of cases, and the rate of rebleeding for these is 3% a year. In those patients treated surgically, the risk of rebleeding is negligible if the aneurysm is solitary and has been successfully isolated from the cerebral circulation, but up to 20% of such patients exhibit cognitive or psychosocial decrements at one year. AVMs cause less early death (about 10%); the risk of rebleeding is 7% in the first year and 3% a year thereafter. In patients with AVMs who did not undergo operative repair and were followed for 20 years, there was a 42% incidence of hemorrhage, 29% incidence of death, 18% risk of epilepsy, and a 27% chance of having neurological impairment.

ICD-9 CODE:

430 Subarachnoid Hemorrhage (SAH)

10.9 SYNCOPE

AEROMEDICAL CONCERNS: Loss of consciousness in flight.

WAIVER: A waiver is not required for simple episodes of vasovagal syncope, with known precipitating causes such as pain or the sight of blood. Normal physiological syncope in response to a training event (i.e. hypoxia demonstrated in a hypobaric chamber or G-induced loss of consciousness (G-LOC) in a centrifuge) does not require a waiver. A waiver is necessary for unexplained syncope, recurrent syncope, syncope associated with pathology (e.g. cardiac conduction or valvular defect), syncope with LOC > 1 minute, delay in recovery of normal function > 5 minutes, or G-LOC > 18 seconds, or syncope associated with convulsions lasting over 6 seconds. Non-waiverable situational syncope includes cough-, postural-, Valsalva-, and exertion ally-induced syncope.

INFORMATION REQUIRED:

1. Detailed history of the event(s)
2. Physical exam
3. EKG
4. Additional cardiovascular studies as indicated (see Syncope algorithm)
5. Psychiatric evaluation (as indicated)

[Note: Syncope Algorithm has not been included in this electronic version for technical reasons.]

TREATMENT: Avoidance, if possible, of known stressors.

DISCUSSION: In 12% of patients with syncope, some type of convulsive movement may occur. Careful history taking, the presence of facial pallor, and the rapid recovery without amnesia help to distinguish syncope from epilepsy. Head injury sustained during the fall may confuse the issue. Presence or absence of incontinence does not help in distinguishing between syncope and seizure. Tongue-biting is strong evidence in support of a seizure and is unlikely in syncope. Recurrent unexplained syncope often can be attributed to psychiatric causes, especially panic disorder, depression, and somatization. Brain scans, EEGs, carotid ultrasound, and lab tests are not usually helpful in arriving at a cause for syncope. If the history, PE, and EKG don't provide the diagnosis, it is unlikely that further studies will help. In cases of cough-, Valsalva- and exertion-induced syncope, remember to consider posterior fossa pathology, especially Arnold-Chiari malformation.

ICD-9 CODE:

780.2 Syncope

10.10 SLEEP DISORDERS

AEROMEDICAL CONCERNS: Disorders of sleep architecture and timing are common in the general population. These disorders frequently result in complaints of excessive daytime somnolence or insomnia with demonstrable deficits in cognitive and psychomotor performance. Aviation personnel perform a variety of complex tasks requiring a high degree of mental and physical well being. Fatigue, sleepiness, and circadian rhythm disturbances can have a critical effect on aviation safety.

WAIVER: Because of the persistent nature and impact on psychomotor and cognitive performance, a history of sleep disorders is generally considered permanently disqualifying without waiver. Waivers may be considered in cases when successfully treated.

INFORMATION REQUIRED:

1. Neurology/sleep specialist consultation with polysomnography (PSG)
2. Psychiatric evaluation (as indicated)

TREATMENT: Treatment options for the sleep disorders vary based upon diagnosis.

DISCUSSION: Diagnosis of a potential sleep disorder requires a detailed history around the individual's sleep complaint. This should include severity, duration, details of sleep schedule, collateral history from a spouse or partner regarding snoring or apneas, significant environmental stressors, and any evidence of underlying psychopathology. Prior to referral to a specialist, every attempt should be made to distinguish a pathologic sleep disorder from poor sleep hygiene. In these cases, simple behavioral modifications may be all that is needed to return the individual to normal function.

Somnambulism, obstructive sleep apnea, narcolepsy, primary insomnia, circadian rhythm disorders, idiopathic hypersomnolence, and periodic limb movement disorder have been the diagnoses submitted for waiver consideration to date.

Somnambulism: Sleepwalking accounts for the majority of requests for sleep related waiver submissions. Due to undesirable or fatal activities that can occur while sleepwalking, a history after age 12 is disqualifying for naval duty, but waivers have been granted for general duty. Sleepwalking episodes typically occur in children before puberty. It is unusual after age 12, with most outgrowing these episodes by age 15. The prevalence in adults has been reported to be approximately 1%, with most persisting from puberty. Recurrent sleepwalking rarely may be associated with a seizure disorder. Other disorders can result in nocturnal wandering (i.e. REM sleep behavior disorder, dissociative disorders, and sleep apnea). These disorders need to be investigated before a primary diagnosis of somnambulism is given. Due to the variable and unpredictable risk to the individual onboard ship, this condition is generally not waived for aviation duty.

Obstructive Sleep Apnea (OSA): OSA has emerged as a major sleep disorder in recent years. Members generally present with complaints of excessive daytime sleepiness (EDS) and snoring. Estimates are that OSA afflicts 1-10% of the general public and has associated with it an increased risk of cardiovascular complications, especially hypertension. Prevalence in aviation personnel is not known. Accurate diagnosis of OSA requires polysomnography (PSG) at a sleep disorders laboratory. An important OSA-variant is Upper Airway Resistance Syndrome (UARS). UARS does not show the characteristic apneas of OSA, but arousals correlate with excessively negative intrathoracic pressures on esophageal manometry. Manometry is not part of the routine sleep study, and therefore UARS is usually a presumptive diagnosis when a snoring, tired, sleep-fragmented patient responds to nasal continuous airway pressure (CPAP). CPAP is considered the treatment of first choice in OSA. CPAP may be used for designated aviation personnel. CPAP use IS NOT approved for aviation applicants. There has been concern raised regarding the deployability of members on ship with CPAP, however CPAP has been successfully deployed in the aircraft carrier environment. Approval for use of CPAP aboard ship must be obtained from the Commanding Officer of the ship in advance (with the Senior Medical Officer's endorsement). Another option is uvulopharyngopalatoplasty (UPPP). UPPP is very effective for treating snoring associated with OSA, but has a less than 50% cure rate for apnea. Oral appliances are less effective than UPPP and not well tolerated, but are a noninvasive alternative in mild to moderate cases. Both are considered second line therapies. Waivers may be considered for OSA with UPPP and/or CPAP after complete resolution of symptoms and a normal follow-up PSG (designated aviation personnel only). An aviator's report of lack of EDS (Excessive Daytime Sleepiness) must be documented objectively (for more details go to [The Nerve Center](#)). The CogScreen-AE with AVT (Aeromedical Vigilance Test) is what we use here in Pensacola, and can be scheduled by calling DSN 922-2257 x 1022. If this is not convenient, other tests may suffice and can be obtained elsewhere. Acceptable alternatives to the CogScreen-AE with AVT include the Conner's CPT (Continuous Performance Test) and the TOVA (Test of Variables of Attention).

Insomnia: The term insomnia is a symptom rather than a specific diagnosis. Insomnia refers to difficulty initiating or maintaining sleep. Among individuals complaining of sleep problems, insomnia is the most common complaint. Insomnia can result from a multitude of diagnoses, including sleep apnea and periodic leg movement disorder. Insomnia is commonly associated with psychiatric disorders including anxiety, depression, personality disorders, or maladaptive traits. Transitional situational insomnia can also result from changes in sleeping environment or in proximity to a significant life event. The psychophysiology of insomnia type occurs as a result of a preoccupation with a perceived inability to sleep, or when poor sleep habits persist following resolution of a stressor. Drug or alcohol related insomnia is another common cause of this complaint. This can result from a variety of agents, including caffeine, which may disrupt sleep architecture as long as 14 hours after ingestion. Most insomnia complaints are transient, resolve in less than 3-4 weeks, and do not require a waiver. Persistent insomnia requires work-up to define an underlying cause. In those cases where an underlying cause is not found, the term Primary Insomnia has been used. Treatment of the underlying diagnosis and a normal sleep study are required before waiver submission.

Idiopathic Hypersomnia: This is a diagnosis of exclusion. It is characterized by complaints of excessive daytime somnolence, generally develops in adolescence or early adulthood, and is

persistent. It is important to differentiate this from Upper Airway Resistance Syndrome, a variant of OSA. Stimulant medications are frequently used in treatment and are not compatible with aviation duty. Despite adequate treatment, it is difficult for patients to maintain adequate task performance. Waiver will not be considered for this diagnosis.

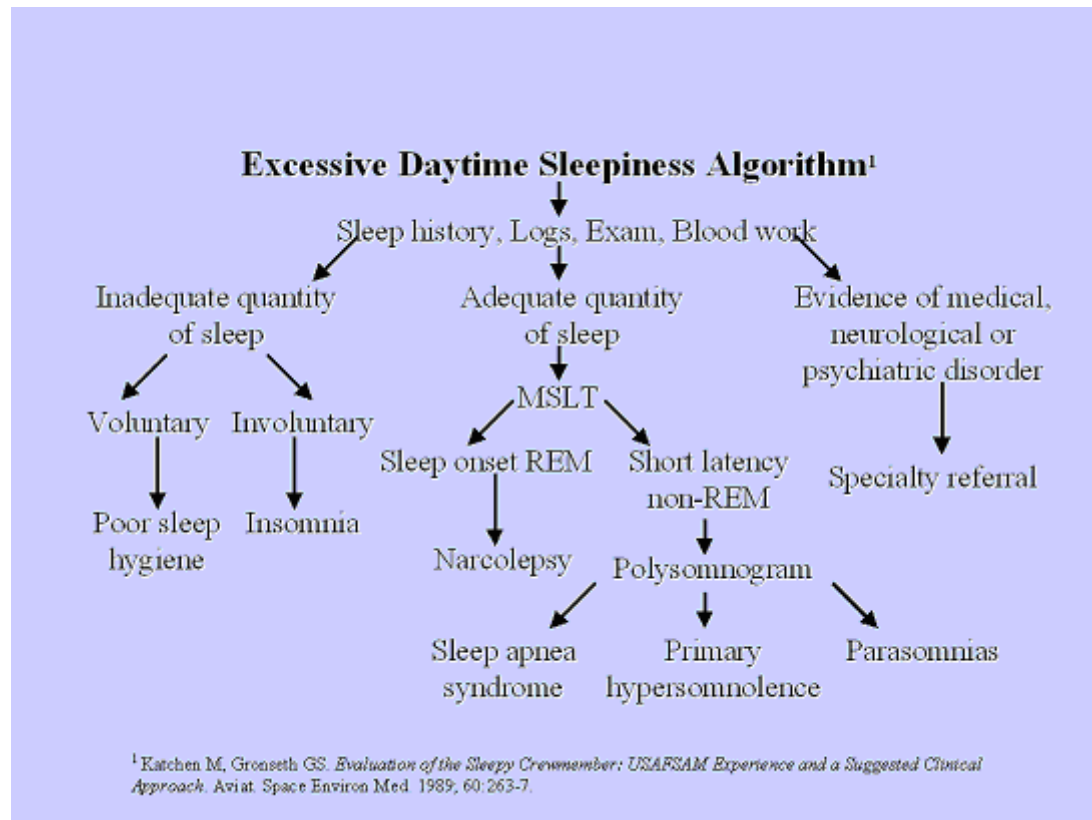
Narcolepsy: Narcolepsy affects 50-70 persons per 100,000. Peak onset occurs in the teens and the 25-30 year age group. The classical tetrad of symptoms includes excessive daytime sleepiness, cataplexy, hypnagogic hallucinations, and sleep paralysis, but not all of these are present in every individual. There is a 40-fold increased risk if there is an immediate family member with the disorder. EDS and sleep attacks are generally the first symptoms observed. Diagnosis is confirmed by sleep studies including Multiple Sleep Latency Test (MSLT) and a polysomnogram. The disorder is characterized by short sleep latencies and rapid-onset REM. Treatment consists of stimulants, which are not compatible with aviation duties. Waivers will not be considered for this diagnosis.

Periodic Limb Movement Disorder (PLM): This disorder is manifested by rhythmic nocturnal myoclonus of the arms and legs and may last minutes to hours. It occurs in the first half of the sleep period and may result in frequent arousals and sleep fragmentation. PLM is present in 17% of those having a polysomnogram for insomnia and can coexist with other sleep disorders including narcolepsy and sleep apnea. 11% of individuals with PLM complain of excessive daytime sleepiness. Treatment consists of benzodiazepines (e.g. clonazepam), which are not consistent with aviation duty. Waivers will not be considered for this diagnosis.

Circadian Rhythm Disorders: This refers to a series of disorders in which there is a disorganization of the regular daily alteration between sleep and wakefulness and its synchrony with the day-night cycle. These disorders can be classified as either persistent or transient. The persistent disorders include Delayed Sleep Phase Syndrome (DSPS), Advanced Sleep Phase Syndrome (ASPS), Non-24 hour Sleep Syndrome, and Irregular Sleep-Wake Syndrome. In DSPS, the circadian system is shifted markedly later than normal (e.g., unable to fall asleep before 3 am and cannot wake up before noon without extraordinary effort). This syndrome occurs in young to middle aged adults. DSPS has been estimated to occur in over 7% of adolescents. It should be noted that the remaining diagnoses are rare. ASPS occurs in the aged and is the exact opposite circadian shift seen in DSPS. In Non- 24 hour Sleep-Wake Syndrome, environmental cues fail to synchronize the internal sleep-wake rhythm with the day-night cycle. This results in the circadian rhythm being shifted 1-2 hours later each day, resulting in cyclical insomnia. Irregular Sleep-wake Syndrome represents a failure of the internal clock. It is manifested by random, scattered sleep-wake periods throughout the 24-hour period. This is usually associated with a tumor or other destructive neurological lesion. Transient conditions include Time-zone Change Syndrome or "Jet-Lag" and Shift-work Syndrome. Jet-Lag is a self-limiting and is NCD, but may necessitate grounding until re-synchrony occurs. The transient sleep disruptions and performance decrements seen in jet-lag may become chronic in the shift worker. Individuals affected severely enough to seek medical attention may best be treated by removal from the shift-work environment. In almost all cases this condition is not compatible with aviation duty and is CD, waiver not recommended. All persistent disorders are CD, but waiver may be considered in successfully treated cases. One should recognize that treatment of

these disorders involves sleep schedule manipulations and successful treatment only occurs in a small percentage of individuals.

Medical Conditions that may disrupt normal sleep include depression (20%), post-viral fatigue syndrome, head injury, anemia, hypoglycemia, thyroid disease, drugs/alcohol, pain, GERD, and pulmonary disease, among others. Treatment of the medical condition generally resolves the sleep complaint.



ICD-9 CODES:

307.40 Nonorganic sleep disorder NOS

307.42 Persistent disorder of initiating or maintaining sleep

307.44 Primary Hypersomnia

307.45 Circadian Rhythm Sleep Disorder

307.46 Somnambulism or Night Terrors

347.00 Narcolepsy

780.57 Sleep Apnea, NOS

780.51 Insomnia with sleep apnea

780.52 Insomnia NEC

780.59 Other Sleep Disturbance

10.11 TRANSIENT ISCHEMIC ATTACK (TIA)

AEROMEDICAL CONCERNS: The symptoms develop abruptly and are unrelated to any particular activity. Symptoms depend on the distribution of the blood vessel concerned and can range from distracting to incapacitating.

WAIVER: TIA's are permanently disqualifying. In rare cases where a curable cause is identified and treated (e.g. ASD with aneurysmal defect - surgically cured), referral for SBFS waiver consideration may be undertaken.

INFORMATION REQUIRED:

1. Neurology consultation
2. MRI scan
3. ECHO (to include bubble-contrast and if negative, trans-esophageal ECHO)
4. Cerebral angiography
5. ESR
6. Lupus anticoagulant
7. Antiphospholipid antibodies
8. CBC (including platelet count)
9. Coagulation studies (PT, PTT)
10. Protein S
11. Homocysteine levels

TREATMENT: Treatment depends upon the underlying cause, if identified. If no surgically correctable etiology, then ASA, low-dose Coumadin, or ticlopidine may be appropriate. Life-style changes and treatment of risk factors (smoking, obesity, HBP, diabetes, hyperlipidemia, alcohol excess, sedentary behavior) need be explored.

DISCUSSION: About 25% of patients with TIA do not appear to have any identifiable serious disease. Approximately 30% have a potential cardiac cause and diabetes is present in 6-28% of patients with TIA. The risk of developing cerebral infarction following TIA is 5-7% a year, with a further 5% a year developing myocardial infarction. The risk of stroke and/or death is 10% a year. These risks rise with age, blood pressure, and the presence of ischemic heart disease. In cases of purely retinal TIA (amaurosis fugax), the 7 year cumulative rate of cerebral infarction is 14% and the 5 year cumulative rate of recurrence is 37%.

ICD-9 CODE:

435.9 Transient Ischemic Attack (TIA)

10.12 TRAUMATIC BRAIN INJURY – MILD

Loss of consciousness (LOC) + post-traumatic amnesia (PTA) = 5 to 60 minutes

Note: Minor Traumatic Brain Injury (PTA + LOC less than five minutes) requires only a careful neurological exam by the examining flight surgeon; if exam is normal condition is NCD.

AEROMEDICAL CONCERNS: Clinically these may appear to be mild injuries, although a surprising percentage of these patients (up to 11%) have significant craniocerebral damage (basilar skull fractures, linear as well as depressed skull fractures, sinus fractures, intracranial hemorrhages, fronto-temporal contusions) which would upgrade the severity level of their injury.

WAIVER: A waiver may be considered as soon as the required work-up is completed. Applicants who have not completed the required workup will be required to wait two years before requesting a waiver.

INFORMATION REQUIRED:

1. Neurology consultation
2. Neuropsychological consultation (e.g. CogScreen-AE plus assessment of memory and information processing skills)
3. Brain imaging study (CT or MRI).

TREATMENT: All patients with head injury causing either loss of consciousness or amnesia (no matter how long) should undergo brain imaging (preferably CT) ASAP as part of initial management.

DISCUSSION: Acute post-traumatic seizures (within one hour of the injury) are not a factor in determining the risk for developing post-traumatic epilepsy (PTE). The risk of developing PTE is not appreciably greater in the mildly head injured population than in the general population. There is a risk of posttraumatic cognitive problems (e.g. memory and information processing skills) and recovery should be documented prior to requesting a waiver.

ICD-9 CODE:

854.06 Traumatic Brain Injury - MILD

10.13 TRAUMATIC BRAIN INJURY – MODERATE

LOC + PTA = 1-24 hours

AEROMEDICAL CONCERNS: Risks include personality and performance changes and the development of posttraumatic epilepsy (PTE).

WAIVER: May be considered for waiver after 12 months grounding. Applicants will not be considered until three years post-injury unless they have completed the required workup.

INFORMATION REQUIRED:

1. Neurology consultation
2. Neuropsychological consultation (e.g. CogScreen-AE plus assessment of memory and information processing skills)
3. Brain imaging study (CT or MRI).

TREATMENT: These patients should undergo initial CT scanning and, if neurologically impaired, repeat scanning within 12 hours of the injury in order to detect "delayed" or progressive intracranial damage that would warrant a change of therapy. Non-surgical measures consist of the basic "ABCs" of ATLS, 30 degrees head elevation, beta-blockers as needed for control of elevated blood pressure, and, when indicated, intubation with hyperventilation, mannitol, and THAM to manage increased ICP (best done with intracranial pressure monitoring).

DISCUSSION: The risk of PTE in cases of moderate head injury at one and 5 years is 0.6% and 1.6%. Of those individuals who develop PTE, 80% do so within the first 2 years. The risk then declines to equal that of the normal population by 10 years post-injury. Approximately 50% of cases with PTE will spontaneously remit within 20 years.

ICD-9 CODE:

854.07 Traumatic Brain Injury - Moderate

10.14 TRAUMATIC BRAIN INJURY - SEVERE

LOC + PTA > 24 hours

AEROMEDICAL CONCERNS: There are greater risks for the development of post-traumatic epilepsy (PTE) and the persistence of permanent neurological and neuropsychological sequelae.

WAIVER: After 30 months grounding, designated personnel may be considered for waiver following NOMI review, patient evaluation, and/or SBFS. Applicants who have not completed the required workup will be required to wait five years prior to waiver consideration.

INFORMATION REQUIRED:

1. Neurology consultation
2. Neuropsychological consultation (e.g. CogScreen-AE plus assessment of memory and information processing skills)
3. Brain imaging study (CT or MRI).

Note that EEGs are no longer required as they have very poor predictive value for PTE. Furthermore, the finding of epileptiform activity in the EEG following head injury has only a 14% correlation with the development of PTE, while fully one half of patients with epilepsy will have normal or non-diagnostic EEG findings even after the clinical appearance of seizures.

TREATMENT: These patients require neuro-ICU level care, frequently with neurosurgical intervention as well.

DISCUSSION: The cumulative risk of PTE at one and 5 years is 7.1% and 13.3%.

ICD-9 CODE:

854.08 Traumatic Brain Injury - Severe

10.15 TRAUMATIC BRAIN INJURY - PERMANENTLY DISQUALIFIED

Permanently disqualifying for all aviation personnel (designated, student, or applicant):

1. Depressed skull fracture with LOC > 5 minutes
2. PTS > one month
3. LOC & PTA > 1 month
4. CSF leak > 7 days
5. Any intracranial bleeding (SDH, EDH, ICH, IVH, SAH)*
6. Dural penetration (traumatic or surgical)
7. Post-traumatic seizures

AEROMEDICAL CONCERNS: These patients are likely to have permanent, disabling residual neurological and neuropsychological impairments as well as an unacceptably high risk for PTE.*

WAIVER: These members are usually permanently NPQ, no waiver, with rare exceptions.

INFORMATION REQUIRED: Rare exceptions may be considered for Special Board of Flight Surgeons (SBFS).

TREATMENT: In addition to neuro-ICU and neurosurgical care, these patients require long-term neuro-rehab care as well.

*Glossary

SDH

Subdural Hematoma

EDH

Epidural Hematoma

ICH

Intracranial Hemorrhage

IVH

Intraventricular Hemorrhage

SAH

Subarachnoid Hemorrhage

PTE

Post Traumatic Epilepsy

ICD-9 CODE:

854.0 Traumatic Brain Injury - Permanently Disqualified

10.16 AEROMEDICAL DISPOSITION OF TRAUMATIC BRAIN INJURIES

Severity	PTA+LOC	GCS	Work-up Documentation				Eligible for Waiver *
.	.	(Lowest score within 24 hour of injury)	FS Exam	Neuro Consult	Neuro Psych Testing	Imaging Study	.
Minor	< 5 min	-	X	.	.	.	NCD
Mild	>5 min but <1 hr or...	13-15	X	X	X	X	LBFS when workup complete
Moderate	>1 hr but <24 hr or...	9-12	X	X	X	X	LBFS at 12 months
Severe	>24 hr or...	3-8	X	X	X	X	NOMI review/eval at 30 months
Penetrating	No waiver

NOTES:

- In all but minor injuries, submission of pertinent contemporaneous medical records is required.
- Waiver eligibility times predicated based on normal exams, neuropsychological testing, imaging studies, etc.
- Any abnormalities or irregularities must be reviewed at NOMI (submit actual films or studies)
- Applicants with history of mild TBI more than 2 years previously require only a normal detailed neurological exam by Flight Surgeon.
- Applicants with history of moderate TBI more than 3 years previously require only a normal detailed neurological exam by FS.
- Applicants with history of severe TBI more than 5 years previously require only a normal detailed neurological exam by FS